

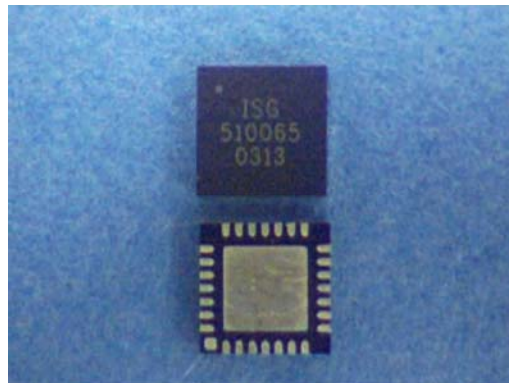


Reliability Qualification Report

S510065-55Z - RoHS Compliant

Products Qualified by Similarity

S510067-55Z



The information provided herein is believed to be reliable at press time. Sirenza Microdevices assumes no responsibility for inaccuracies or omissions. Sirenza Microdevices assumes no responsibility for the use of this information, and all such information shall be entirely at the user's own risk. Data subject to change.

303 S. Technology Ct, Broomfield CO, 80021

Phone: (800) SMI-MMIC

<http://www.sirenza.com>

Document RQR-104850 Rev A





S510065-55Z

Reliability Qualification Report

I. Qualification Overview

The S510065-55Z family of products has demonstrated reliable operation by passing all qualification testing in our product qualification test plan. The S510065-55Z has been subject to stresses such as humidity (autoclave), extreme hot and cold environments (temperature cycling), moisture sensitivity (MSL-1 and solder reflow testing), and has demonstrated reliable performance.

II. Introduction

Sirenza Microdevices' S510065-55Z is a downconverter designed to be used as an Out-of-Band Tuner for CATV set-top box and Digital Ready TV applications. This device offers optimum performance with low power consumption and low distortion.

III. Fabrication Technology

These downconverters are manufactured using CMOS technology which feature a high degree of process stability and reliability.

IV. Package Type

The S510065-55Z is packaged in a plastic encapsulated 5mm X 5mm QFN package that is assembled using a highly reproducible automated assembly process. The die is mounted using an industry standard thermally and electrically conductive silver epoxy.

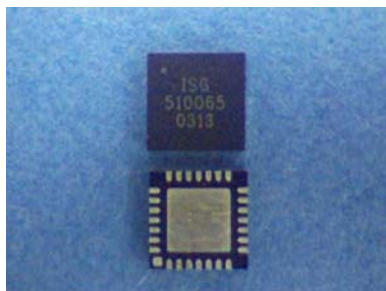


Figure 1: Image of 5mm X 5mm QFN Encapsulated Plastic Package



S510065-55Z

Reliability Qualification Report

V. Qualification Methodology

The Sirenza Microdevices qualification process consists of a series of tests designed to stress various potential failure mechanisms. This testing is performed to ensure that Sirenza Microdevices products are robust against potential failure modes that could arise from the various die and package failure mechanisms stressed. The qualification testing is based on JEDEC test methods common to the semiconductor industry. A FMEA approach is used to determine the test methods to be included in the qualification plan. The manufacturing test specifications are used as the PASS/FAIL criteria for initial and final DC/RF tests.

VI. Qualification By Similarity

A device can be qualified by similarity to previously qualified products provided that no new potential failure modes/mechanisms are possible in the new design. The S510067-55Z is qualified by similarity to the S510065-55Z.

VII. Operational Life Testing

Sirenza Microdevices defines operational life testing as a DC biased elevated temperature test performed at the maximum operational junction temperature limit. For the S510065-55Z, the maximum operational temperature limit is 150°C. The purpose of the operational life test is to statistically show that the product operated at its maximum operational ratings will be reliable by operating devices up of 1000 hours. The results for this test are expressed in device hours that are calculated by multiplying the total number of devices passing the test by the number of hours tested.

VIII. Moisture Sensitivity Level - MSL Level 1 Device

S510065-55Z has successfully completed 168 hours of moisture soak (85°C/85%RH), followed by three passes through a convection reflow oven at 270°C. The successful completion of this test classifies the part as JESD 22-A113B Moisture Sensitivity Level 1 (MSL-1). MSL-1 indicates that no special dry pack requirements or time limits from opening of static bag to reflow exist for the S510065-55Z. MSL-1 is highest level of moisture resistance that a device can be classified according to the above mentioned standard.



S510065-55Z

Reliability Qualification Report

IX. Electrostatic Discharge Classification

Sirenza Microdevices classifies Human Body Model (HBM) electrostatic discharge (ESD) according to the JESD22-A114 convention. All pin pair combinations were tested. The Pass/Fail status of a part is determined by the manufacturing test specification. The ESD class quoted indicates that the device passed exposure to a certain voltage, but does not pass the next higher level. The following table indicates the JESD ESD sensitivity classification levels. The results of the testing indicate that S510065-55Z's HBM ESD rating is Class 2.

Class	Passes	Fails
0	0 V	<250 V
1A	250 V	500 V
1B	500 V	1000 V
1C	1000 V	2000 V
2	2000 V	4000 V

Part	Class
S510065-55Z	2

X. Latch-Up

Sirenza Microdevices performs Latch-Up testing according to the JESD78 convention. All pin pair combinations were tested at room temperature. The Latch-Up criteria is defined as an irreversible increase in current
 Trigger source: +/-10ma to +/-110mA in +/-10ma increments
 Positive Pulse Voltage Clamp: +5.4V
 Negative Pulse Voltage Clamp: -1.8V
 Sample Size: 6
 Results: All passed

XI. Operational Life Test Results

The results for S510065-55Z High Temperature Operating Life Test are as follows

Test Duration	Junction Temperature	Quantity	Device Hours
1000 hours	125°C	77	77,000
1000 hours	150°C	78	78,000





S510065-55Z

Reliability Qualification Report

XII. Qualification Test Results

Group	Test Name	Test Condition/ Standard	Sample Size	Results
B	Preconditioning	MSL1 Reflow @ 270°C Peak JESD22-A113C	180	Pass
B1	High Temperature Operating Life	Tj = 125°C 1000 hours JESD22-A108B	77	Pass
		Tj = 150°C 1000 hours JESD22-A108B	78	Pass
B2	Autoclave	Tamb=121°C, 100%RH Un-Biased, 96 hours JESD22-A102C	10	Pass
B3	Temperature Cycle	-65°C to +150°C 10 min dwell, 1 min transition 1000 cycles JESD22-A104B	20	Pass
B4	Temperature-Humidity	Tamb=85°C, 85%RH Un-Biased, 1000 hours	30	Pass
C	Low Temperature Storage	Tamb=-40°C 1000 hours	30	Pass
D	High Temperature Storage	Tamb=150°C 1000 hours JESD22-A103B	30	Pass
F	Tin Whisker	Tamb=60°C, 90%RH 2850 hours NEMI	10	Pass
G	Solderability	Dip & Look Steam Age Condition C Dip Condition B, 245°C JESD22-B102C	15	Pass